Characteristics and Real-World Outcomes Following CAR T-Cell Therapy in Relapsed Multiple Myeloma: A Multi-Institutional US Descriptive Study

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Introduction

Multiple myeloma (MM) is an incurable hematologic malignancy that presents significant challenges in terms of relapse and refractory disease. Chimeric antigen receptor (CAR) T-cell therapy has demonstrated remarkable efficacy in treating relapsed/refractory MM. Understanding the characteristics of patients receiving CAR T-cell therapy, as well as their healthcare utilization, is critical for optimizing patient management and resource allocation.

Aim

To determine characteristics, mortality, and healthcare utilization in patients with MM treated with CAR T-cell therapy.

Objectives

The primary outcomes included survival, baseline demographics, and metrics for healthcare utilization, such as hospitalizations, emergency department visits, and intensive care unit stays within 6 months of CAR T-cell infusion.

Methods

Design: This was a descriptive study conducted using the multi-institutional US database, TriNetX. Patients were followed for a duration of 6 months.

Setting: This is a multicenter, descriptive study utilizing the TriNetX real-world database network.

Participants: Data on patients >18 years old with relapsed/refractory MM treated with commercial CAR T-cell therapy were extracted from the TriNetX real-world database network. Patients with relapsed MM who had received one of the FDA-approved CAR-T treatments, idecabtagene vicleucel or ciltacabtagene autoleucel, were eligible.

Results

Demographics	
Average Age (years)	64.5 ± 9.41
Female	43%
Race/Ethnicity	
White	72%
Black	17%
Hispanic	6%
Hospital Resource Utilization	
Hospitalization (within 3 months)	78.6% (n=802)
Critical Care Utilization	7.0% (n=71)
Ventilation Management	3.2% (n=33)
Common Complications	
Cytokine Release Syndrome (CRS)	45.5% (n=465)
Sepsis	7.0% (n=71)
Septic Shock	2.3% (n=23)
Neurotoxicity Syndrome (ICANS)	~1%
Outcomes	
Mortality Rate	7.1% (n=72)

Figure 1. Patient Outcomes Following CAR T-Cell Therapy (N=1,021)

A total of 1,021 patients were evaluated. The average age was 64.5±9.41 years, and 43% were female. The cohort was primarily non-Hispanic (84%) or White (72%), with 6% Hispanic and 17% Black patients. Within 3 months of CAR T-cell infusion, 802 patients (78.55%) required hospitalization. Critical care services were used by 71 (6.95%) patients, with 33 (3.23%) patients requiring ventilation management. Sepsis was diagnosed in 71 (6.95%) patients, and septic shock in 23 (2.25%). Cytokine release syndrome was reported in 465 (45.54%) patients, while neurotoxicity syndrome occurred in approximately 1%. The mortality rate during the follow-up period was 72% (7.05%).

Discussion

These findings emphasize the importance of proactive toxicity management strategies and adequate healthcare resource planning to support the growing use of CAR T-cell therapy in MM in real-world settings. Further research is needed to identify predictors of high healthcare utilization and to assess the long-term impact on healthcare costs and survival rates.